

## JOSH K. WILLIS

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## EDUCATION

PH.D. OCEANOGRAPHY	2004
<i>Scripps Institution of Oceanography,</i> <i>University of California, San Diego</i>	<i>La Jolla, California</i>
DISSERTATION: <i>Combining satellite and in situ data to make improved estimates of upper-ocean thermal variability on eddy to global scales</i>	ADVISOR: DEAN ROEMMICH
M.S. PHYSICS	1998
<i>University of California, San Diego</i>	<i>La Jolla, California</i>
B.S. PHYSICS AND MATH	1996
<i>University of Houston, Honors College</i>	<i>Houston, Texas</i>

## PROFESSIONAL EXPERIENCE

DEPUTY PROJECT SCIENTIST FOR JASON-1 AND JASON-2	2009 – PRESENT
<i>Jet Propulsion Laboratory, Pasadena, California</i>	
SCIENTIST	2006 – PRESENT
<i>Jet Propulsion Laboratory, Pasadena, California</i>	
CALTECH POSTDOCTORAL SCHOLAR	2004 – 2006
<i>Jet Propulsion Laboratory, Pasadena, California</i>	
GRADUATE STUDENT RESEARCHER	1996 – 2004
<i>University of California, San Diego, La Jolla, California</i>	

## MEMBERSHIP IN SERVICE AND TECHNICAL ORGANIZATIONS

- Member, American Geophysical Union
- Member, GRACE Science Team
- Member, Atlantic Meridional Overturning Circulation Science Team
- Member, CLIVAR Global Synthesis and Observations Panel

## AWARDS AND HONORS

- 2007 Contributing author to the IPCC Fourth Assessment Report (Chapter 5)
- 2008 Dr. Charles K. Witham Environmental Stewardship Award, JPL
- 2009 Ranger Award for contributions to the Jason-1 and Jason-2 Missions, JPL
- 2009 Presidential Early Career Award for Scientists and Engineers (PECASE)

## RESEARCH INTERESTS

Observing changes in global and regional sea level and their causes using data from satellite altimeters, gravimeters and in situ observation. Understanding the role of the ocean in the global climate system and changes in the general circulation of the ocean and their impact on the transport of heat by the ocean.

## PUBLICATIONS

- Willis, J. K., D. Roemmich, and B. Cornuelle, Combining altimetric height with broadscale profile data to estimate steric height, heat storage, subsurface temperature, and sea-surface temperature variability, *J. Geophys. Res.*, 108 (C9), 3292, 2003.
- Willis, J. K., D. Roemmich, and B. Cornuelle, Interannual variability in upper-ocean heat content, temperature and thermosteric expansion on global scales, *J. Geophys. Res.*, 109 (C12036), 2004.
- Willis, J. K., "Combining satellite and in situ data to make improved estimates of upper-ocean thermal variability on eddy to global scales," Doctoral Dissertation, Scripps Institution of Oceanography, 2004.
- Roemmich, D., J. Gilson, J. Willis, P. Sutton, K. Ridgway, Closing the time-varying mass and heat budgets for large ocean areas: The Tasman Box, *J. Climate*, 18(13), 2005.
- Hansen, J., L. Nazarenko, R. Ruedy, M. Sato, J. Willis, A. Del Genio, D. Koch, A. Lacis, K. Lo, S. Menon, T. Novakov, J. Perlitz, G. Russell, G.A. Schmidt, N. Tausnev, Earth's Energy Imbalance: Confirmation and Implications, *Science*, 308, 2005.
- G. C. Johnson, J. M. Lyman, J. K. Willis, "Heat Content", in State of the Climate in 2005. Shein, K.A., ed., *Bulletin of the American Meteorological Society*, 87, S23-S34, 2006.
- Wong, T., B. A. Wielicki, R. B. Lee, G.L. Smith, K. A. Bush, and J. K. Willis, Re-examination of the observed decadal variability of earth radiation budget using altitude-corrected ERBE/ERBS nonscanner WFOV data, *J. Climate*, 19(16), pp. 4028–4040, 2006.
- Contributing author for Chapter 5, Observations: Oceanic Climate Change and Sea Level, IPCC Fourth Assessment Report, 2007.
- Lyman, J., J. K. Willis, G. Johnson, Recent cooling of the upper ocean, *Geophys. Res. Lett.*, 33, L18604, doi:10.1029/2006GL027033, 2006
- Willis, J. K., J. M. Lyman, G. C. Johnson, and J. Gilson, Correction to "Recent cooling of the upper ocean". *Geophys. Res. Lett.*, 34, L16601, doi:10.1029/2007GL030323, 2007.
- Johnson, G. C., J. M. Lyman, and J. K. Willis, "Global Oceans: Heat Content," In State of the Climate in 2006, A. Arguez, Ed., *Bulletin of the American Meteorological Society*, 88, 6, S31-S33, 2007.
- Willis, J.K., D. P. Chambers, R. S. Nerem, Assessing the Globally Averaged Sea Level Budget on Seasonal to Interannual Time Scales, *J. Geophys. Res.*, 113, C06015, doi:10.1029/2007JC004517, 2008.
- Tamrazian, A., S. LaDochy, J. Willis, and W. C. Patzert, Heat Waves in Southern California: Are They Becoming More Frequent and Lasting Longer?, *Yearbook of the APCG*, 70, 59-69, 2008.
- Johnson, G. C., J. M. Lyman, and J. K. Willis, 2008: Global Oceans: Ocean Heat Content. In State of the Climate in 2007, D. H. Levinson and J. H. Lawrimore, Eds., *Bulletin of the American Meteorological Society*, 89, 7, S39–S41, doi: 10.1175/BAMS-89-7-StateoftheClimate.
- Wijffels, S.E., J. Willis, C.M. Domingues, P. Barker, N.J. White, A. Gronell, K. Ridgway, and J.A. Church, Changing Expendable Bathymeterograph Fall Rates and Their Impact on Estimates of Thermosteric Sea Level Rise. *J. Climate*, 21, 5657–5672, 2008.
- Willis J. K., L.-L. Fu, Combining altimeter and subsurface float data to estimate the time-averaged circulation in the upper ocean, *J. Geophys. Res.*, 113, C12017, doi:10.1029/2007JC004690, 2008.
- Willis, J.K., Is It Me, or Did the Oceans Cool? A Lesson on Global Warming from my Favorite Denier, *U.S. CLIVAR Variations*, 6 (2), U.S. CLIVAR Office, 2008.
- Chambers D. P., J. K. Willis, Analysis of large-scale ocean bottom pressure variability in the North Pacific, *J. Geophys. Res.*, 113, C11003, doi:10.1029/2008JC004930, 2008

- Dickey J. O., S. L. Marcus, J. K. Willis, Ocean cooling: Constraints from changes in Earth's dynamic oblateness (J 2) and altimetry, *Geophys. Res. Lett.*, 35, L18608, doi:10.1029/2008GL035115, 2008.
- Willis, J.K., J.M. Lyman, G.C. Johnson, and J. Gilson, 2009: In Situ Data Biases and Recent Ocean Heat Content Variability. *J. Atmos. Oceanic Technol.*, **26**, 846–852.
- Chambers D. P., J. K. Willis (2009), Low-frequency exchange of mass between ocean basins, *J. Geophys. Res.*, **114**, C11008, doi:10.1029/2009JC005518.
- Marcus, S. L., J. O. Dickey, J. K. Willis, and F. K. Seitz (2009), Earth oblateness changes reveal land ice contribution to interannual sea level variability, *Geophys. Res. Lett.*, **36**, L23608, doi:10.1029/2009GL041130.
- Willis, J. K., Can In-Situ Floats and Satellite Altimeters Detect Changes in Atlantic Ocean Overturning? (2010), *Geophys. Res. Lett.*, **37**, L06602, doi:10.1029/2010GL042372.
- Lyman, J. M., S. A. Good, V. V. Gouretski, M. Ishii, G. C. Johnson, M. D. Palmer, D. A. Smith, and J. K. Willis (2010), Robust warming of the global upper ocean, *Nature*, **465**, 334-337 doi:10.1038/nature09043.
- Syed, T., J. Famiglietti, D. Chambers, J. Willis and K. Hilburn (2010), Increasing Continental Freshwater Discharge from Satellite-Based Global Ocean Mass Balance (1994-2006), *PNAS*, submitted.

## RECENT INVITED TALKS AT SCIENTIFIC MEETINGS

- Upper-Ocean Thermal Variability on Global Scales: a decade of satellite and in situ measurements* (J. Willis), NASA Sea Level Meeting, Washington, D.C., April 2005.
- Observations of the steric component of sea level rise* (J. Willis and D. Roemmich), IAMAS Meeting, Beijing, China, August 2005.
- Estimating circulation and upper-ocean thermal variability from a combination of satellite, Argo and other in situ data*, (J. Willis and L.-L. Fu,) CLIVAR, OOPC, GOOS, Argo, CPPS Meeting, Concepción, Chile, October 2005.
- Ocean Heat Content* (J. Willis), CLIVAR Global Synthesis and Observations Panel, San Diego, CA, December 2006.
- In Situ Data and Ocean Heat Content Estimates* (J. Willis), CLIVAR GSOP Panel, MIT, Cambridge, MA, September 2007.
- Toward closing the globally averaged sea level budget on seasonal to interannual time scales* (J. Willis, D. P. Chambers, and R. S. Nerem), European Geosciences Union, General Assembly, Vienna, Austria, April 2008.
- A new estimate of interannual variability in upper ocean heat content in light of recently discovered in situ data biases* (J. Willis), European Geosciences Union, General Assembly, Vienna, Austria, April 2008.
- Pie in the sky: ocean warming and sea level rise during the era of satellite oceanography* (J. Willis), William Smith Meeting of the Geological Society, London, U.K, September 2008.
- When the Ocean Speaks We Better Listen, Observing Climate Change in the Oceans from Above and Below* (J. Willis), NESDIS Senior Leadership Retreat, Scripps Institution of Oceanography, La Jolla, CA, June 2008.
- The Day after Yesterday: Good Science, Bad Movies and the Ugly Truth about the AMOC's Role in Global Climate* (J. Willis), AMOC Science Team Meeting, Annapolis, MD, May 2009.
- Observing Steric Changes in the World Ocean: Argo and the Way Forward* (J. Willis), NASA Sea Level Workshop, Austin, TX, November 2009.
- Warming or Melting? Dissecting the Causes of Sea Level Rise over the Past 16 Years* (J. Willis), 2009 AGU Fall Meeting, San Francisco, CA, December 2009.

